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**NOTES ON PALEARCTIC HEMEROBIIDAE
(NEUROPTERA). I. INTRODUCTION AND GENUS
WESMAELIUS KRUGER, 1922. PART 2(2). SUBGENUS
KIMMINSIA KILLINGTON 1937**

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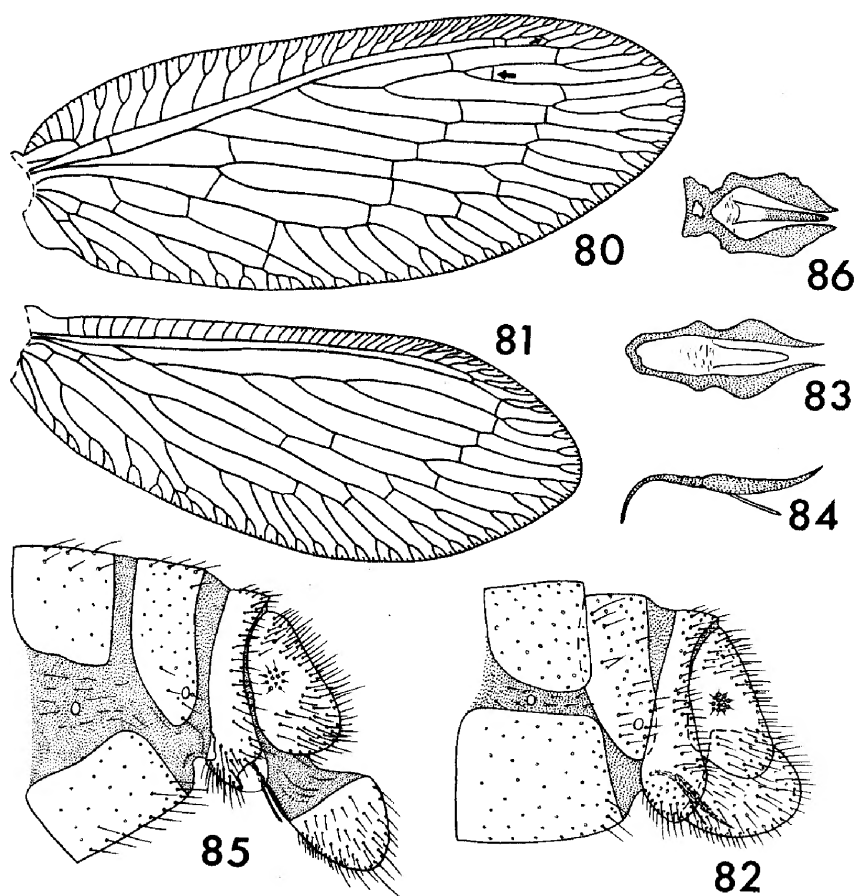
***Wesmaelius (Kimminsia) rava* (Withycombe, 1923)**

Figs 80-86

Boriomyia rava Withycombe, 1923: 202. Holotype: ♂, Great Britain: "Ozshott, Surrey, 5.V 1923 (by myself), on *Pinus sylvestris*". [BMNH].

Kimminsia ogatai Nakahara, 1956: 184, fig. 2; pl. 18, fig. 3, syn. n. Holotype: ♀, Japan: "Asiya, near Osaka, 4.X 1955 (Masami Ogata)"; examined. In National Science Museum, Tokyo.

COLORATION. Face dark brown; clypeus brown; vertex pale yellow to dark yellow. Palpi pale, brownish, in the Siberian specimen darker. Antennae pale, brownish, somewhat darker towards the apex; scapus sometimes brown from the outside. Notum light yellow to dark yellow, narrowly bordered laterally with dark brown. Pronotum with a narrow longitudinal median brown stripe and yellowish lateral lobes. Legs pale, brownish yellow; tibial spots rather inconspicuous, in the Siberian specimen distinct. Forewing membrane pale yellowish or greyish, with numerous regular very inconspicuous sagittate spots. No dark maculation. Crossveins of the series partly or entirely narrowly margined with brownish; crossvein *m-cua* in *Gr*₃ sometimes margined with brown more or less broadly. Longitudinal veins with about regular pale and fuscous lengths. Crossveins mostly dark. Hind wing membrane pale, yellowish or greyish, sometimes slightly darker along wing



Figs 80-86. *Wesmaelius ravus*, female: 80) forewing, 81) hind wing, 82, 85) apex of abdomen, lateral view, 83, 86) subgenitale, ventral view, 84) same, lateral view (Figs 80-84, the holotype of *W. ogatai*).

margin. Veins pale, sometimes darker towards the outer wing margin; in the Siberian specimen venation mostly dark.

VENATION. Forewing (N=6) (Fig. 80). *Rs* with 3 (N=3) or 4 (N=3) branches, the distal one with 3 secondary branches. *Gr*₂ with 5 (N=3, from Great Britain and Siberia) or 6 (N=3, from Japan) crossveins. *Gr*₃ with 7 (N=1), 8 (N=3), 9 (N=1) or 10 (N=1) crossveins (two last wings from Japan). Between branches of *Cu* 1 (N=4) or 2 (N=2, from Japan). Marginal crossvein *cup-a*₁ always present. Additional crossveins: Between *Sc*-branches (N=1); intra-*Rs*-forking crossvein (N=1, holotype of *W. ogatai*). Hind wing (N=5) (Fig. 81). *Rs* with 4 (N=2, from Great Britain) or 5 (N=3, from Japan) bran-

ches. *b* ending proximally to origin of *Rs*₁. *r* always absent. *Gr*₂ with 2 (N=3) or 3-4 (male from Japan) crossveins. *Gr*₃ with 7 (N=2, Great Britain) or 8 (N=3, Japan) crossveins. Marginal crossvein *cua-a*₁ always present.

MALE. Description of genitalia see: Killington, 1937: 73, figs 82; Kis et al, 1970: 176, fig. 81; Monserrat, 1978: 178, figs 2-8.

FEMALE. Apex of abdomen as in Figs 82, 85, subgenitale as in Figs 83, 84, 86.

FOREWING LENGTH. 7.8 mm (N=1).

DISTRIBUTION. EUROPE: Great Britain, France, Spain, Italy, Germany, Finland, Norway, Austria, Switzerland, Czech Republic, Slovakia, Slovenia, Hungary, Albania, Greece, Romania, Russia (Samarskaya obl., Dagestan, Buryatia), Turkey (Anatolia), *Japan (Honshu, Kyushu).

MATERIAL EXAMINED. Great Britain: England, Bucks, July-August 1959 (G. Smith), 1 ♂. - Japan: Kyushu, 1 ♂. See also: Makarkin (1987).

REMARKS. *Kimminsia ogatai* Nakahara is a junior synonym of *W. rarus* (cf. Figs 83 and 86). Moreover, the male of *W. rarus* from Japan does not differ from that of Great Britain.

Wesmaelius (Kimminsia) nervosus (Fabricius, 1793)

Figs 87-94

Hemerobius nervosus Fabricius, 1793: 85. France: "Habitat in Gallia Mus. Dom. Bosc." [Depository unknown.].

Hemerobius betulinus (nec Strom, 1788): auctorum.

Hemerobius nebulosus Stephens, 1836: 107 (partim). Great Britain: "in the neighbourhood of London, and [...] in Scotland". [? BMNH.]. Synonymized by MacLachlan, 1868: 187.

Hemerobius conspersus Burmeister, 1839: 974. Germany: "bei Halle". [Depository unknown.]. Synonymized by Hagen, 1866: 410.

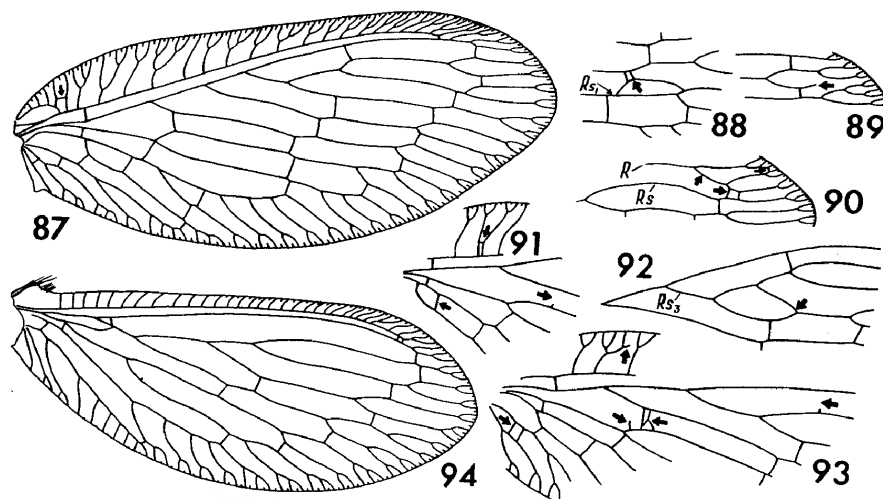
Mucropalpus distinctus Rambur, 1842: 421. Spain: "dans le midi de l'Espagne". [Depository unknown.]. Synonymized by Hagen, 1866: 410.

Hemerobius disjunctus Banks, 1897: 25. Lectotype: ♂ (designated by Klimaszewski & Kevan, 1987), USA: "New Hampshire, Mt. Washington, N.Banks coll". In Museum of Comparative Zoology, Harvard. Synonymized by Klimaszewski & Kevan, 1987: 169.

Wesmaelius nervosa var. *neurasthenica* Navas, 1914. Holotype: ♂, "Karskaya mundra, N. Tobols. gub. [=Tyumenskaya obl.] (F.Zaitsev), 17.VII 1909; Siberie (68° lat.); *Boriomyia nervosa* F. [male] v. *neurasthenica* Nav. (Nav. det.); Typus"; "*Kimminsia betulina* E. Luppova det."; examined. [ZIS].

Hemerobius frostinus Navas, 1933: 110. USA: Massachusetts, Framingham. [Depository unknown.]. Synonymized by Klimaszewski & Kevan, 1987: 169.

Kimminsia cinerea Nakahara, 1960: 53, figs 107-110; pl. 13, fig. 27. Holotype: ♂, Japan: "Mt. Takao, near Tokyo, 24.IV 1958 (K. Fujimoto)"; examined. In National Science Museum, Tokyo. Synonymized by Monserrat, 1990: 240.



Figs 87-94. *Wesmaelius nervosus*: 87-93) forewings, 94) hind wing.

Kimminsia alexanderi Nakahara, 1965: 217. USA: "Alaska, Haines Highway, M.P., 5.VI 1952 (Alexander)". In U.S. National Museum. Synonymized by Klimaszewski & Kevan, 1987: 169.

Kimminsia melaleuca Nakahara, 1965: 219. USA: "Alaska Highway, M. P. 320, Yukon Territory, 2.VI 1952 (Alexander)". In U.S. National Museum. Synonymized by Klimaszewski & Kevan, 1987: 169.

Kimminsia acuminata Yang, 1980: 61, figs 2 H, 8. Holotype: ♂, China: "Liaoning, 15.V 1955". [AUB]. Synonymized by Makarkin, 1986: 607.

COLORATION. Face dark to black. Vertex pale, yellowish or greyish yellow with 4 dark spots (two on the lateral sides and two anteriorly) and with a distinct median dark stripe posteriorly. Palpi pale brownish. Antennae rather pale brownish; scapus often partly dark brown. Notum pale yellowish to greyish, conspicuously margined with dark brown to black laterally. Pronotum sometimes with a short median longitudinal dark stripe. Mesonotum sometimes with indistinct dark spots. Legs pale with darker apical joints of tarsi. The fore and middle tibia with two distinct dark spots outside. Forewing membrane almost colourless. Sagittate spots rather poorly visible. Conspicuous dark brown spots occurring around the crossvein *m-cua* of *Gr*₃ and crossveins of cubital area. A degree of the developing of the maculation is a matter of high intraspecific variability but maculation always absent in a cell limited by the longitudinal veins *M* and *CuA* and crossveins of *Gr*₂ and *Gr*₃. Longitudinal veins pale yellowish with dark interruptions of various size. Crossveins dark. In hind wing veins in the basal half of the wing pale, in the apical one darker. The apex of *CuA* and its branches is most dark. Sometimes dark lengths of veins occur also in the basal part of the wing.

VENATION. Forewing (N=68) (Fig. 87). *Rs* with 2 (N=2) or 3 (N=66) branches, the distal one with 2 (N=16), 3 (N=43) or 4 (N=9) secondary branches; *Gr*₁: *rs*-*m* reduced (N=1, Fig. 91), double (N=2) or multiplicate (N=1, Fig. 93). *Gr*₂ with 3 (N=1), 4 (N=5), 5 (N=56) or 6 (N=6) crossveins, of these 1 furcate, 1 double, 1 *r*-*rs* absent (Fig. 93). *Gr*₃ with 7 (N=17), 8 (N=38), 9 (N=12) or 10 (N=1) crossveins, of these 9 double, 2 furcate and 1 triple. Between *Cu*-branches 1 (N=12), 2 (N=55) or 3 (N=1) crossveins, of these 1 double. Marginal crossvein *cup*-*a*₁ present or absent (N=1). Basal crossveins: *cup*-*a*₁ double (N=1); *a*₁-*a*₂ double (N=1, Fig. 93). Additional crossveins: between *Sc*-branches 1 crossvein (N=3); basal *cua*-*cup* (N=1, Fig. 91); *r*-*rs*₁ (N=1); between branches of *M* (N=1); between branches of *R* (N=1, Fig. 90). Anomalies: *Rs*-branches fused with each other (N=1, Fig. 92); *Rs* with incomplete apex (N=1, Fig. 89); *Rs* with a loop-like duplication (N=2, Fig. 88). Hind wing (N=37) (Fig. 94). *Rs* with 3 (N=3), 4 (N=33) or 5 (N=1) branches. Intraradial cell of variable size. *b* ending proximally to *r* (except of one case). *r* absent (N=4) or furcate (N=1). *Gr*₂ with 1 (N=2), 2 (N=34) or 3 (N=1) crossveins. *Gr*₃ with 4 (N=1), 5 (N=1), 6 (N=4), 7 (N=29) or 8 (N=2) crossveins, of these 1 furcate. Additional crossvein: between *Rs* and *M* nearly distal to forking of *M* (N=1).

MALE. Description of genitalia see: Killington, 1937: 80, fig. 85; Kis et al., 1970: 173; Aspöck et al., 1980: figs 511-513.

FEMALE. Description of genitalia see: Killington, 1937: fig. 86; Aspöck et al., 1980: fig. 551.

FOREWING LENGTH. Male: 7.8-9.4 mm (8.7 mm), N=15; female: 8.1-10.0 mm (9.1 mm), N=15.

DISTRIBUTION. Greenland, Ireland, Island, Great Britain, France, Spain, Italy, Montenegro, Germany, Denmark, Austria, Belgium, Luxemburg, Netherlands, Switzerland, Sweden, Norway, Finland, Latvia, Estonia, Poland, Croatia, Slovakia, Slovenia, Czech Republic, Hungary, Bulgaria, Albania, Romania, Moldova, Ukraine (Lvovskaya obl., Ivano-Frankovskaya obl.), Russia (Leningradskaya obl., Murmanskaya obl., Arkhangelskaya obl., Komi, *Yamalo-Nenetskiy A.R., Moskovskaya obl., Belgorodskaya obl., Samarskaya obl., Ul'yanovskaya obl., Chelyabinskaya obl., Dagestan, Stavropolskiy krai, Chechnya, North Krasnoyarskiy krai, Altaiskii krai, Tuva, Irkutskaya obl., Chitinskaya obl., Buraytia, (?) Yakutia ["Lena river": Hagen, 1858], Kamchatka, Chukotka, Khabarovskii krai, Primorskii krai, Sakhalin, Kunashir I.), Iran, Armenia, East Kazakhstan, Kirgizia, China, Japan (Honshu, Hokkaido), Canada, USA.

MATERIAL EXAMINED. Russia (37 ex.), Armenia (2 ex.), Japan (3 ex.).

Wesmaelius (Kimminsia) subnebulosus (Stephens, 1836)

Hemerobius subnebulosus Stephens, 1836: 107. Great Britain: "in June near London". [? BMNH].

Hemerobius fuscus Stephens, 1836: 107. Great Britain: "about London, in June and July". [? BMNH]. Synonymized by MacLachlan, 1868a: 185.

Hemerobius nebulosus Stephens, 1836: 107 (partim). Great Britain: "in the neighbourhood of London, and ... in Scotland". [? BMNH]. Synonymized by MacLachlan, 1868a: 185.

Hemerobius obscurus Stephens, 1836: 108. Great Britain: "near London, in June, and in Scotland". [? BMNH]. Synonymized by MacLachlan, 1868a: 185.

Boriomyia maorica Tillyard, 1923: 221, fig. 3. Holotype: (?) ♀, New Zealand: "Dunedin, N.Z., taken at light by myself in Mr. W.G. Horer's residence in George Street, in February, 1920". In Cawthron Institute. Synonymized by Wise, 1973: 181.

COLORATION. Face blackish brown, labrum brown. Vertex pale yellowish with 2 anterior and 2 lateral dark spots and with an inconspicuous median dark stripe and numerous very small dark spots as well. Palpi brown. Antennae pale brown, scapus sometimes with dark spot. Notum pale with numerous minute dark spots, broadly margined with blackish brown laterally. Pronotum with narrow median dark stripe. Legs brownish, the fore and middle tibia with 2 distinct dark spots. Forewing membrane with numerous brownish sagittate spots including the cell limited by veins *M*, *CuA*, *Gr*₁ and *Gr*₂. Most conspicuous spots occurring around the crossveins of the cubital area and *m-cua* of *Gr*₃. Veins coloured as in *W. nervosus*. Hind wing membrane more or less unicolorous, almost all veins dark except for origins of *Sc*, *R* and *M*.

VENATION. Forewing (N=20). *Rs* with 3 branches; *Rs*₃ with 2 (N=13) or 3 (N=17) secondary branches. *Gr*₁: crossvein *m-cua* distal to forking of *M*. *Gr*₂ with 5 crossveins. *Gr*₃ with 7 (N=17) or 8 (N=3) crossveins, of these 1 double. Between *Cu*-branches 2 (N=19) or 3 (N=1) crossveins. Marginal crossvein *cup-a*₁ always present. Additional crossvein: between branches of *Rs*₃ (N=1). Hind wing (N=10). *Rs* with 4 branches. Intraradial cell of moderate size. *b* ending proximally to *r*. *Gr*₂ with 2 crossveins. *Gr*₃ with 6 (N=1) or 7 (N=9) crossveins, of these 1 double. Between *Cu*-branches 1 (N=2) or 0 (N=8) crossveins.

MALE. Description of genitalia see: Killington, 1937: 89, fig. 87; Kis et al., 1970: 169; Aspöck et al., 1980: figs 523-525.

FEMALE. Description of genitalia see: Killington, 1937: fig. 88; Aspöck et al., 1980: fig. 555.

FOREWING LENGTH. 7.0-9.5 mm.

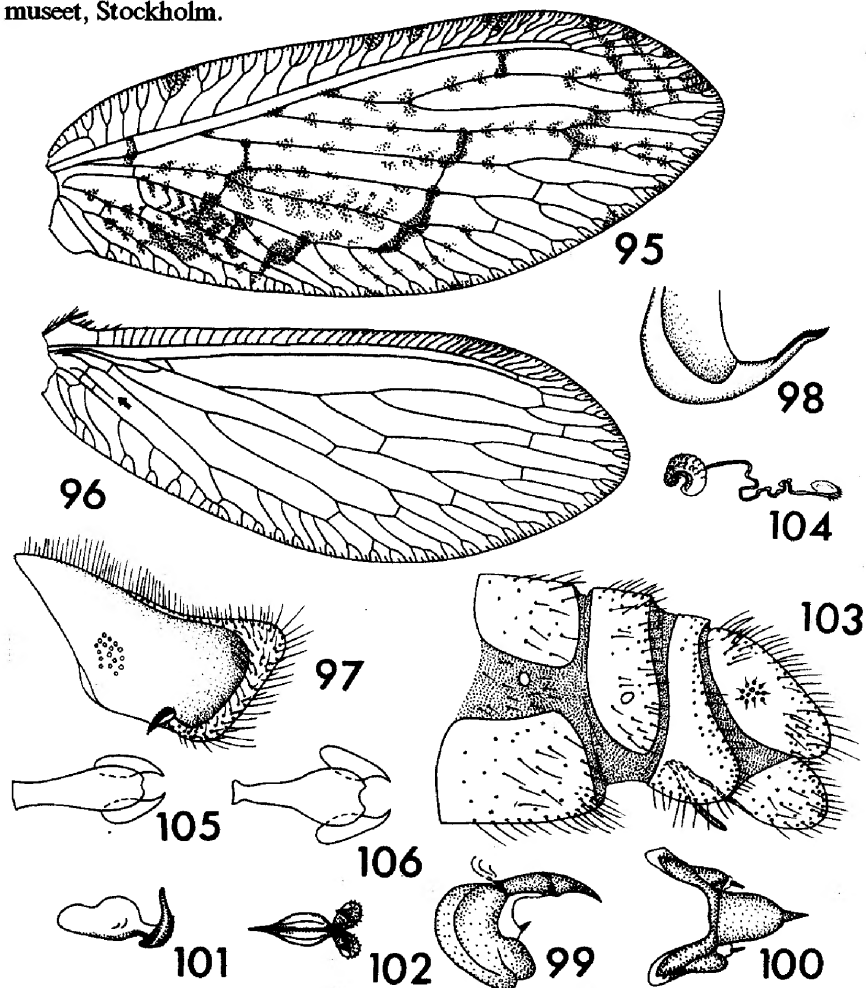
DISTRIBUTION. Ireland, Great Britain, France, Andorra, Portugal including Madeira and Azores Is., Spain including Canary Is., Montenegro, Germany, Austria, Belgium, Luxemburg, Switzerland, Netherlands, Sweden, Finland, Latvia, Poland, Croatia, Czech Republic, Slovakia, Hungary, Serbia, Slovenia, Bulgaria, Romania, Greece, Cyprus, Ukraine (Kievskaya obl., *Nikolaevskaya obl., Kharkovskaya obl., Khersonskaya obl., Crimea), Russia (St-Petersburg, Leningradskaya obl., Moskovskaya obl., Kurskaya obl., Dagestan, *Yamalo-Nenetskiy A.R., Chitinskaya obl.), Morocco, Iran, Turkey, Armenia, *Azerbaijan, Turkmenia, Tadjikistan, North America (? introduced), New Zealand (introduced).

MATERIAL EXAMINED. Ukraine (4 ex.), Russia (4 ex.), Armenia (3 ex.), Azerbaijan (1 ex.), Iran (1 ex.), Tadjikistan (1 ex.).

Wesmaelius (Kimminsia) sufuensis Tjeder, 1968

Figs 95-106

Wesmaelius sufuensis Tjeder, 1968: 137, figs 1-12. Holotype: ♂, China: "Xinjiang Uygur, Kashgar, leg. G.R. Raquette". In Naturhistoriska riksmuseet, Stockholm.



Figs 95-106. *Wesmaelius sufuensis*: 95) forewing, 96) hind wing, 97) right ectoproct, lateral view, 98) apex of ectoproct, caudal view, 99) gonarcus, lateral view, 100) same, dorsal view, 101) parabaculum, lateral view, 102) same, dorsal view, 103) apex of abdomen, lateral view, 104) spermatheca, 105-106) subgenitale, ventral view. 97-102) male, 103-106) female.

COLORATION. Head dark brown with yellowish vertex. Palpi yellowish brown. Antennae yellow basally, brownish apically. Thorax brownish laterally. Notum yellow, dark brown laterally. Legs pale yellowish with very bright or at least distinct tibial spots. Forewing membrane very pale, almost colourless with numerous dark brown contrastic spots (Fig. 95). Sagittate spots distinct, not numerous. Longitudinal veins very pale with short dark brown interruptions. Crossveins mostly dark brown. Hind wing membrane colourless with brownish spot around the crossvein *m-cua*. Veins pale except for several dark brown apical veins and the base of *CuA*.

VENATION. Forewing (N=4) (Fig. 95). *Rs* with 3 branches, *Rs*₃ with 2 (N=2) or 3 (N=2) secondary branches. *Gr*₂ with 4 (N=1) or 5 (N=3) crossveins; *Gr*₃ with 7 crossveins. Between *Cu*-branches 2 crossveins. Marginal crossvein *cup-a*₁ always present. Hind wing (N=4) (Fig. 96). *Rs* with 3 (N=1) or 4 (N=3) branches. *b* ending proximally to *r*; intraradial cell small. *Gr*₂ with 2 crossveins. *Gr*₃ with 6 (N=1) or 7 (N=3) crossveins.

MALE. Ectoproct as in Figs 97-98, gonarcus as in Figs 99-100, parabaculum as in Figs 101-102.

FEMALE. Apex of abdomen as in Fig. 103, spermatheca as in Fig. 104, subgenitale as in Figs 105-106.

DISTRIBUTION. Russia (Altai Mts), *Kazakhstan (Alma-Atinskaya obl.), Kirgizia, *Tadjikistan, Mongolia, China (Xinjiang Uygur).

MATERIAL EXAMINED. KAZAKHSTAN: vic. Vernyi [=Alma-Ata], 23.IV 1920 [larva or pupa], emerged in autumn (collector unknown), 1♀. - TADJIKISTAN: Pamir, Agach-Kurgan on Kudar River, 20.VIII 1928 (Gorbunov), 1♀. See also: Makarkin (1986).

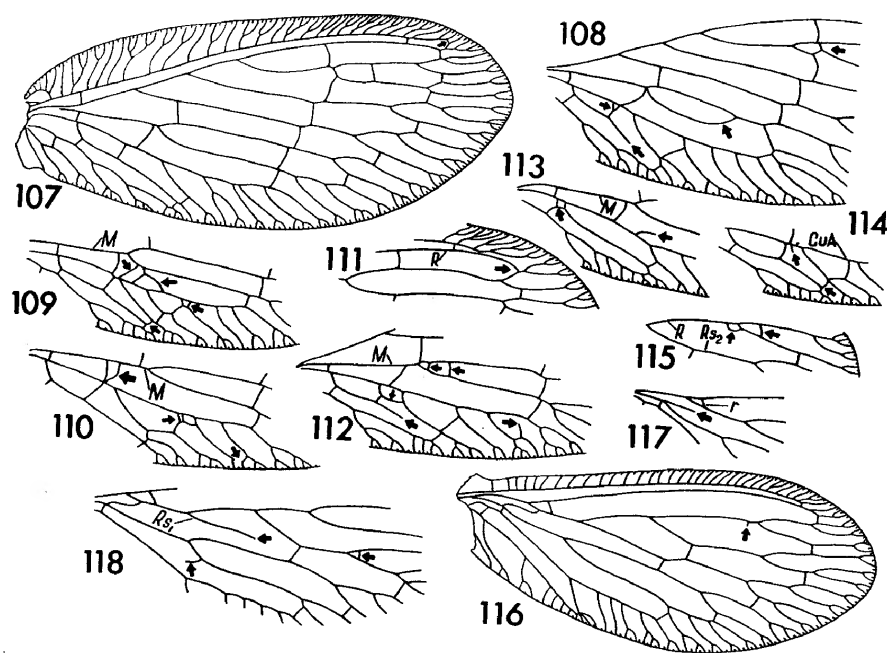
***Wesmaelius (Kimminsia) furcatus* (Banks, 1935)**

Figs 107-127

Boriomyia furcata Banks, 1935: 55. Holotype: ♂, USA: "Colorado, Argentine Pass". In Museum of Comparative Zoology, Harvard.

Wesmaelius pseudofurcatus Makarkin, 1986: 608, figs 7, 9, 10, 25. Holotype: ♀, Russia: "Magadanskaya obl., Atka on Yama River, 29.VI 1981 (Ryabukhin)"; examined. [ZIS]. Synonymized by Makarkin, 1990: 42.

COLORATION. Head dark brown frontally, sometimes almost black. Genae and labrum pale brownish yellow. Vertex yellowish brown, dark brown anteriorly with dark brown median stripe and numerous minute spots. Palpi brownish with darker apical joint. Antennae brownish, darker towards apex. Scapus dark brown anteriorly. Pronotum pale brownish, dark brown laterally, with a narrow median dark stripe and with 4 dark depressions; lateral lobes pale. Mesonotum brownish medially, with numerous very small brown spots, dark brown laterally. Metanotum almost entirely dark brown. Legs relatively pale, yellowish brown with conspicuous spots on the fore and middle tibia and dark brown apical joint of tarsi. Fore femora from the outside, hind femora and tibia apically dark. Maculation of forewings nervosus-like. Forewing membrane somewhat tinged with fuscous, with numerous brownish sagittate spots through over the wing. Dark contrastic



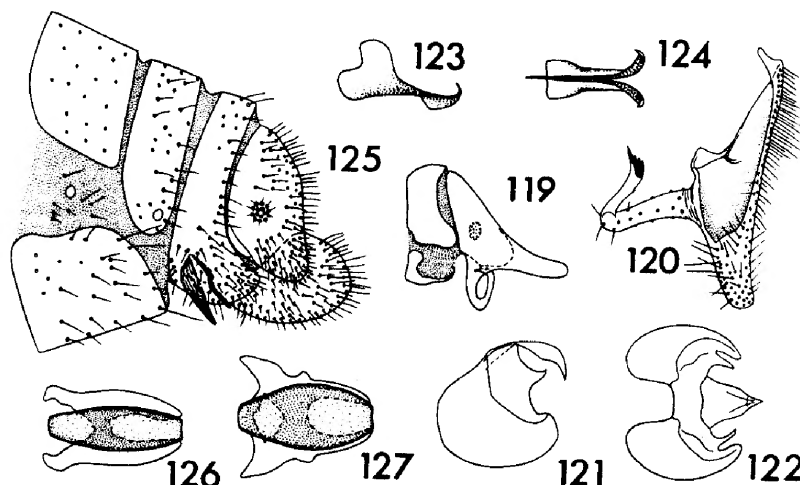
Figs 107-118. *Wesmaelius furcatus*: 107-115) forewings, 116-118) hind wings.

spots not numerous, mainly around the crossvein *m-cua* in *Gr*₃ and crossveins of cubital area. Crossveins of gradate series *Gr*₂ and *Gr*₃ margined with dark brown. Longitudinal veins with alternate pale and dark lengths. Crossveins almost entirely dark brown.

VENATION. Forewing (N=96) (Fig. 107). *Rs* with 3 branches, extremely rare with 2 (N=1) or 4 (N=6). Distal branches with 1 (N=4), 2 (N=45), 3 (N=45) or 4 (N=2) secondary ones. *CuA* with 3-5 branches. *Gr*₂ with 3-5 (mainly 5) crossveins. *Gr*₃ with 6-8 (mainly 7) crossveins. Between branches of *Cu* 1-4 (mainly 3) crossveins. Anomalies: rather abundant (Fig. 108-115). Hind wing (N=16) (Fig. 116). *Rs* with 3 (N=2) or 4 (N=13) branches. Intra-radial cell very small. *b* ending *Rs* proximal to *r*. *Gr*₂ with 1 (N=1) or 2 (N=15). *Gr*₃ with 6-7 crossveins. Anomalies: *b* incomplete (N=1) (Fig. 117); *Rs*₁ incomplete (N=1) (Fig. 118).

MALE. Apex of abdomen as in Fig. 119, ectoproct as in Fig. 120, gonarcus as in Figs 121-122, parabaculum as in Figs 123-124.

FEMALE. Apex of abdomen as in Fig. 125, subgenitale as in Figs 126-127.



Figs 119-127. *Wesmaelius furcatus*: 119) apex of abdomen, lateral view, 120) ectoproct, caudal view, 121) gonarcus, lateral view, 122) same, dorsal view, 123) parabaculum, lateral view, 124) same, dorsal view, 125) apex of abdomen, lateral view, 126-127) subgenitale, ventral view. 119-124) male, 125-127) female.

FOREWING LENGTH. 6.3-8.9 mm.

DISTRIBUTION. Russia (Altai Mts, Buryatia, *Irkutskaya obl., *Yakutia, Magadanskaya obl.), Canada, USA.

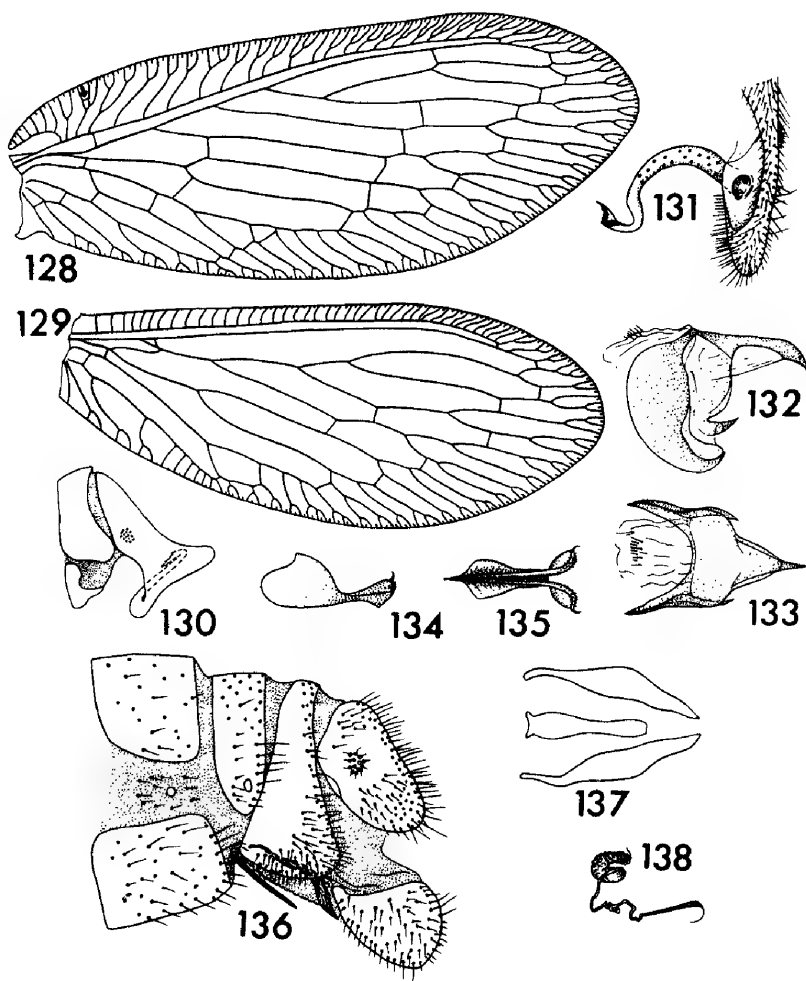
MATERIAL EXAMINED. RUSSIA: Magadanskaya obl.: Aborigin Research Station, 11.VIII 1986 (V. Dubatolov), 1 ♀; 20 km E Kulu, 25.VII 1983 (V. Makarkin), 1 ♀. - Yakutia: district of Moms, Indigirka River, mouth of Yctan-Yuryakh, 29.VI 1970 (V. Kovalev), 1 ♀. - Irkutskaya obl.: Mts East Sayany, "Okinskii stan", 12.VII 1913 (Tolstov), 1 ♀. See also: Makarkin (1986; 1987).

REMARKS. *W. pseudofurcatus* was described by me on the basis of vast differences in structure of subgenitale between the North American females of *W. furcatus* illustrated by Carpenter (1940) and those of the North Far East. The investigations of Klimaszewski and Kevan (1987) showed however that subgenitale of *W. furcatus* is very variable in the shape, so *W. pseudofurcatus* is a synonym of *W. furcatus*.

***Wesmaelius (Kimminisia) altissinus* (Ohm, 1967)**

Figs 128-138

Boriomyia altissima Ohm, 1967: 238, figs 24-34. Holotype: ♂, Nepal: "Manangboth, 28°40' nordl. Breite, 48°1' ostl. Lange, Nuatinath, 3500 m, 5.VIII 1955, (F. Lobrichter)". In Bayerische Staatssammlung, Munchen.



Figs 128-138. *Wesmaelius altissimus*: 128) forewing, 129) hind wing, 130) apex of abdomen, lateral view, 131) apex of ectoproct, caudal view, 132) gonarcus, lateral view, 133) same, dorsal view, 134) parabaculum, lateral view, 135) same, dorsal view, 136) apex of abdomen, lateral view, 137) subgenitale, ventral view, 138) spermatheca. 130-135) male, 136-138) female.

Kimminsia bihamita Yang, 1980: 57, figs 1, 2b, 4. Holotype: ♂, China: "Beijing, 28.III 1960". [AUB]. Synonymized by Makarkin, 1984: 420.

COLORATION. Head brownish yellow, frons dark brown, clypeus brown; vertex with minute brown spots. Palpi brownish, rather pale. Antennae brownish yellow. Notum brownish yellow with numerous small

brownish spots, broadly margined with dark brown laterally. Pronotum with a narrow median dark stripe; lateral lobes pale. Legs pale yellowish brown with distinct spots on the fore and middle tibia. Hind tibia somewhat darker apically. Tarsal segments dark brown. Forewing with very numerous conspicuous sagittate spots through over the wing. Spots around the crossveins of series Gr_2 and Gr_3 and in cubital and anal areas darker and bigger. Longitudinal veins with alternate pale and dark lengths. Crossveins mostly dark. Hind wing membrane colourless, without conspicuous shadings. Longitudinal veins partly pale, partly dark (especially Rs -stem and CuA). Crossveins entirely or partly brown.

VENATION. Forewing ($N = 9$) (Fig. 128). Rs 3-branched, Rs_3 with 2 ($N=4$) or 3 ($N=4$) secondary branches. Gr_1 : rs_1-m furcate ($N=1$), placed distally to M -forking ($N=6$), proximally to this forking ($N=2$) or just at this point ($N=1$). Gr_2 with 5 crossveins. Gr_3 with 7 ($N=4$) or 8 ($N=4$) crossveins. Between Cu -branches 2 ($N=7$) or 3 ($N=2$) crossveins. Marginal crossvein $cup-a_1$ always present. Additional crossveins: between Sc -branches 1 crossvein ($N=2$, Fig. 128); $r-rs_1$ ($N=1$); rs_1-m distal to Gr_2 ($N=1$). Hind wing ($N=10$) (Fig. 129). Rs 4-branched. Intraradial cell of variable size. b ending always proximally to r . Gr_2 with 2 ($N=9$) or 3 ($N=1$) crossveins. Gr_3 with 7 ($N=9$) or 8 ($N=1$) crossveins, of these 1 double and 1 furcate. Between branches of Cu 0 ($N=6$), 1 ($N=3$) or 2 ($N=1$) crossveins.

MALE. Apex of abdomen as in Fig. 130, ectoproct as in Fig. 131, gonarcus as in Figs 132-133, parabaculum as in Figs 134-135.

FEMALE. Apex of abdomen as in Fig. 136, subgenitale as in Fig. 137, spermatheca as in Fig. 138.

FOREWING LENGTH. Male: 8.0-8.8 mm, $N=2$; female: 8.1-9.4 mm, $N=6$.

DISTRIBUTION. *Kirgyzstan, (?) Tadjikistan, Kazakhstan (Vostochno-Kazakhstanskaya obl., *Alma-Atinskaya obl., Semipalatinskaya obl.), Mongolia, *South Korea, China (Beijing, Sichuan, Tibet, Shaanxi, Hebei, Ningxia Hui), Nepal.

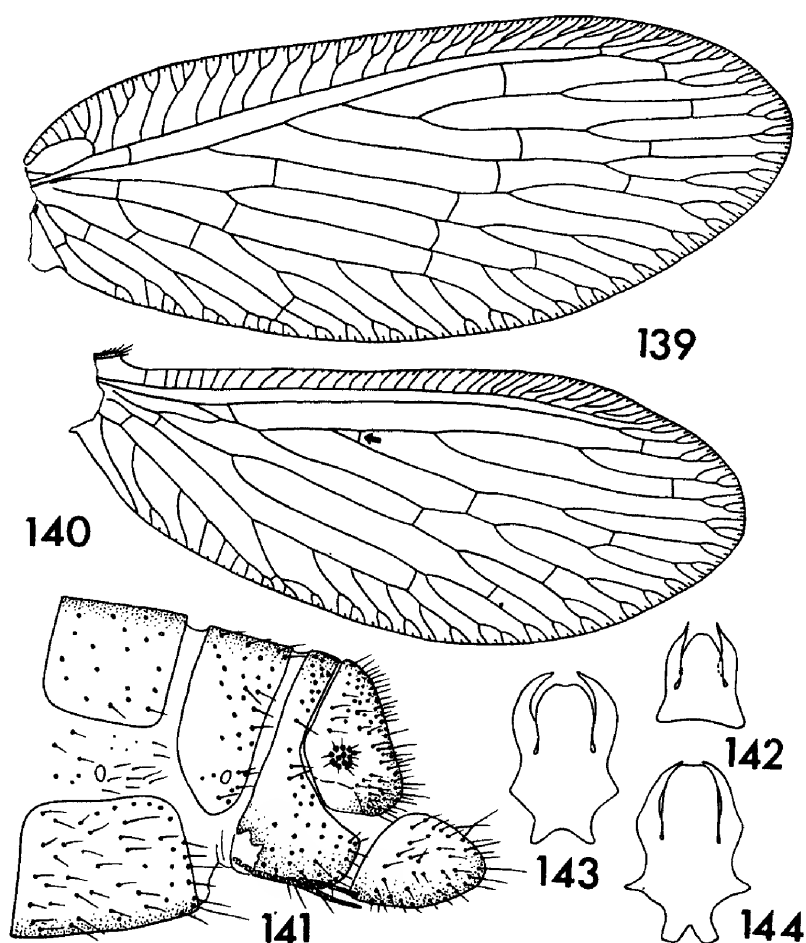
MATERIAL EXAMINED. KIRGYZSTAN: "Frunze [Beshkek], No. 1376", 1 ♂; Turkestanskiy Ridge, on Juniperus tree, 22.VI 1947 (Davletshina), 2 ex. - KAZAKHSTAN: Alexandrovskii [=Kirgiz-skii] Ridge, Makbal, 8.VI 1910 (Kirichenko), 1 ex.; valley of Chochoy River, left bank of Kenkoli River, the Juniperus excelsa zone, 21.VII 1930 (L. Bianki), 1 ex. - Alma-Atinskaya obl.: vic. Alma-Ata, Medeo, in Picea schrenkiana forest, 21.IX 1969 (K. Gorodkov), 1 ♀. - KOREA: Chollabuk-Do, Sannae-Myeon, Manbokdae, 1000-1200 m, 14.V 1991 (T. Saigusa), 1 ♀.

***Wesmaelius (Kiminsia) mortoni mortoni* (MacLachlan, 1899)**

Figs 139-143

Hemerobius mortoni MacLachlan, 1899: 79, fig. Lectotype: ♂, Great Britain: "Rannoch, 11-14.VI 1898, K.J. Morton" (designated by Kimmins, 1963). In the Morton Collection, Royal Scottish Museum, Edinburgh.

Boriomyia enontekiensis Klingstedt, 1929: 105. Holotype: ♂, Finland: "Enontekio". [Depository unknown.]. Synonymized by Kimmins, 1963.



Figs 139-144. *Wesmaelius mortoni*: 139-143) *W. mortoni mortoni*, female: 139) forewing, 140) hind wing, 141) apex of abdomen, lateral view, 142-143, subgenitale, ventral view; 144) *W. mortoni kozlovi*, subgenitale of female, ventral view.

COLORATION. Head yellowish with dark brown frons. Palpi and antennae pale, brownish yellow. Scapus somewhat darker outside. Thorax pale, yellow to brownish yellow. Pronotum with an inconspicuous interrupted median brown stripe and brownish patches laterally to that. Metanotum brown laterally. Legs pale with indistinct spots on tibia. Forewing membrane with pale brownish yellow inconspicuous sagittate spots. The more or less

distinct but rather pale spots occurring around the crossveins of Gr_2 and especially of $m-cua$ in Gr_3 . Longitudinal veins with the short alternate pale and dark lengths. Hind wing membrane colourless, slightly shaded around the distal crossvein $m-cua$. Veins brownish yellow.

VENATION. Forewing (N=4) (Fig. 139). Rs with 3 branches, the distal one with 2-3 secondary branches. CuA with 3-4 branches. Gr_2 with 5 crossvein. Gr_3 with 6-7 crossveins. Between CuA and A_1 2-3 crossveins. Hind wing (N=4) (Fig. 140). Rs with 3 (N=1) or 4 (N=3) branches. CuA with 4-5 branches. Gr_3 with 5 (N=3) or 6 (N=1) crossveins. Between CuA - branches a crossvein present.

MALE. Description of genitalia see: Kimmins, 1963: 140, figs 1-9; Aspöck et al., 1980: 542-544.

FEMALE. Apex of abdomen as in Fig. 141; subgenitale as in Figs 142-143.

DISTRIBUTION. Great Britain, France, Germany, Austria, Sweden, Norway, Finland, Czech Republic, Slovakia, Hungary, Bulgaria, Romania, *Ukraine (Kievskaya obl.), Russia (Leningradskaya obl., Irkutskaya obl.), Turkey.

MATERIAL EXAMINED. UKRAINE: Kiev, Malyutinka, from larva No. 2c, 20.II 1980 (M. Nesterov), 1 ♀. See also: Makarkin (1986).

REMARKS. Examined female from Kiev, regarded here as *W. mortoni*, however has peculiar subgenitale (Fig. 142).

***Wesmaelius (Kimminsia) mortoni kozlovi* Makarkin, 1984, stat.n.**

Fig. 144

Wesmaelius kozlovi Makarkin, 1984: 420, fig. 1. Holotype: ♀, Mongolia: "Dzabhan aymak, Songino, 1.VII 1978 (M. Kozlov)"; examined. [ZIS].

COLORATION. This subspecies distinguished by darker colour, well-development dark stripe in pronotum, distinct spots in fore tibia, and distinct brown markings in forewing.

MALE. Unknown.

FEMALE. Subgenitale as in Fig. 144.

FOREWING LENGTH. Female: 8.9 mm, N=1.

DISTRIBUTION. Mongolia.

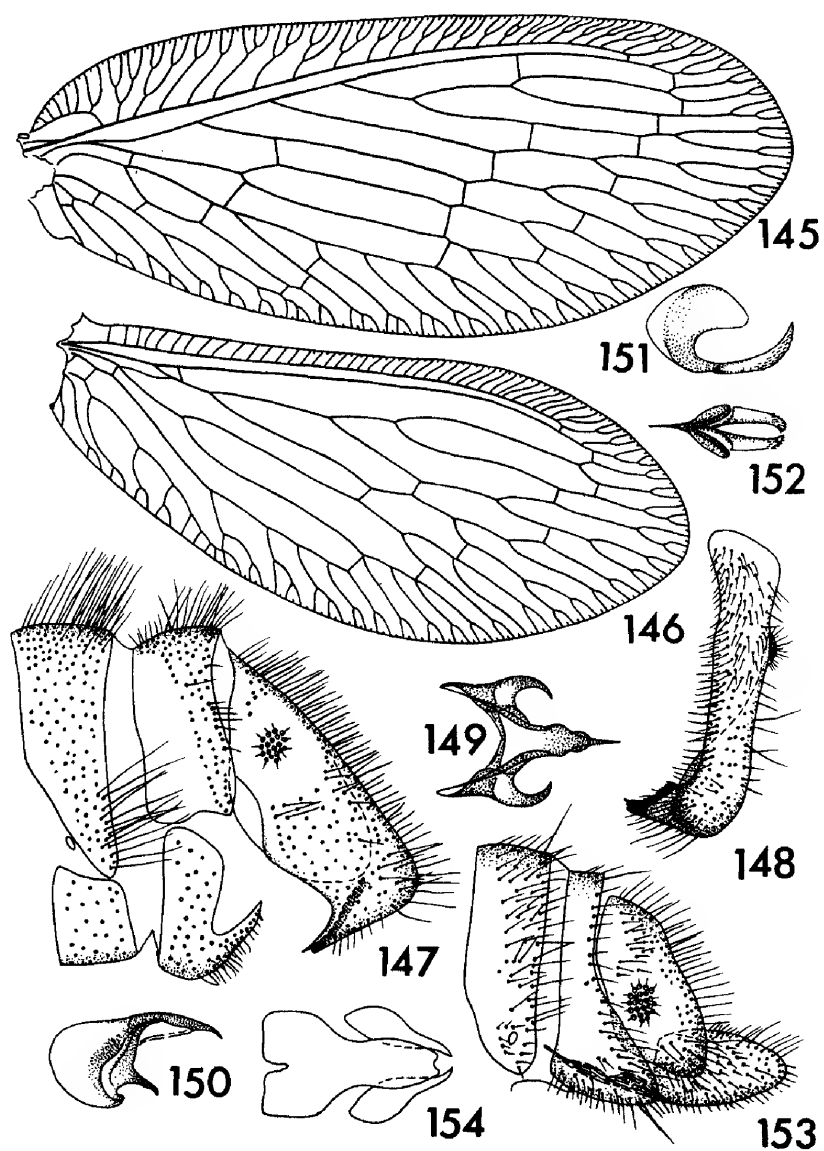
***Wesmaelius (Kimminsia) malladai* (Navas, 1925)**

Figs 145-154

Hemerobius malladai Navas, 1925: 30, fig. 7. Holotype: ♂, Bulgaria: "Bulgarien, VIII 1917, Sitnjakovo, Tscheter Tope, 1730 m. (S.G. Boettlicher)". In Zoologisches Museum der Humboldt-Universität, Berlin.

Kimminsia killingtoni Morton in Fraser, 1942: 80. Syntypes: Great Britain, Norway, Sweden. In Morton Collection, Royal Scottish Museum, Edinburgh. Synonymized by Kimmins, 1963.

COLORATION. Head brownish yellow. Frons dark brown. Vertex brownish to brown anteriorly, with a median longitudinal dark stripe posteriorly. Palpi light brown. Antennae yellowish brown, darker towards the



Figs 145-154. *Wesmaelius malladai*: 145) forewing, 146) hind wing, 147) apex of abdomen, lateral view, 148) ectoproct, caudal view, 149) gonarcus, dorsal view, 150) same, lateral view, 151) parabaculum, lateral view, 152) same, dorsal view, 153) apex of abdomen, lateral view, 154) subgenitale, ventral view. 147-152) male, 153-154) female.

apex. Pronotum brownish yellow, brown laterally, with an inconspicuous longitudinal median dark stripe and brown patches; lateral lobe pale. Meso- and metanotum yellowish, brown laterally. Legs pale, brownish yellow with very poorly developed tibial spots. Forewing membrane with very pale inconspicuous sagittate spots. Crossveins of Gr_2 and Gr_3 of cubital area margined with brownish. A spot surrounding the crossvein *m-cua* is the most distinct. Longitudinal veins with alternate pale and slight brown lengths. Crossveins mostly brown. Hind wing membrane colourless. Veins pale, rarely dark brown.

VENATION. Forewing (N=14) (Fig. 145). *Rs* with 3 (N=8) or 4 (N=6) branches, the distal one with 2 (N=4), 3 (N=8) or 4 (N=2) secondary branches. Gr_1 : *cua-cup* double (N=1). Gr_2 with 5 (N=11) or 6 (N=3) crossveins. Gr_3 with 7 (N=2), 8 (N=8) or 9 (N=4) crossveins, of these 2 double. Between branches of *Cu* 2 (N=11) or 3 (N=3) crossveins. Additional crossveins: between *Sc*-branches 3 crossveins (N=1). Hind wing (N=10) (Fig. 146). *Rs* with 3 (N=2) or 4 (N=8) branches. Intraradial cell small. *b* ending proximally to *r*. *r* double (N=1). Gr_2 with 2 crossveins. Gr_3 with 6 (N=1), 7 (N=8) or 8 (N=1) crossveins, of these 1 furcate.

MALE. Apex of abdomen as in Fig. 147; ectoproct as in Fig. 148; gonarcus as in Figs 149-150; parabaculum as in Figs 151-152.

FEMALE. Apex of abdomen as in Fig. 153; subgenitale as in Fig. 154.

FOREWING LENGTH. Male: 8.8-9.3 mm, N=2; female: 9.0-9.3 mm, N=2.

DISTRIBUTION. Great Britain, France, Spain, Italy, Montenegro, Germany, Austria, Switzerland, Denmark, Sweden, (?) Norway, Finland, Poland, Czech Republic, Slovakia, Bulgaria, Slovenia, Albania, Greece, Romania, Ukraine (Ivano-Frankovskaya obl.), Russia (Murmanskaya obl., Komi, Severnaya Ossetia, Buraytia), Turkey.

MATERIAL EXAMINED. RUSSIA: Murmanskaya obl.: Mts Khibiny, basin of Vud'yavr Lake, 8.VI 1936 (Fridolin), 2♂, 1♀. - Caucasus: "Mt. Yaglu-dara, 9000 ft., 22.VII 1939 (M. Ryabov)", 1 ex. See also: Makarkin (1987).

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